Service Manual

U2

AM/FM-STEREO
2 BANDS RADIO RECEIVER

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SPECIFICATION

FM. ELECTRICAL PERFORMANCE

Model: U2	Brand: SANGEAN/ROBERTS	Temp: 25	R. H. : 75 %	Date: 2003/9/9

Test Item	Condition			Value		Test No.			Unit
	Input	Output	freq	Nom.	Lim.	1	2	3	
Tuning Range			Min	87	+-0.2				MHz
			Max	108.5	+-0.3				
Intermediate freq.				10.7	+-0.1				MHz
Max. Sensitivity		S/N=6dB	90	12	18				dB
			98	12	18				
			106	12	18				
Usable Sensitivity		S/N=30dB	90	18	24				dB
			98	18	24				
			106	18	24				
Image Rejection	127.4MHz	R.O.	106	32	26				dB
I.F. Rejection	10.7MHz	S/N=6dB	90MHz	60	50				dB
3db Limiting(1mV)			98MHz	18	24				dB
Min. output	60dB		98MHz	3	5				mv
Tuning Ind. Sens.			98MHz	18	24				dB
Current consumption	60dB	Rated output	98MHz	150	180				mA
AFC action range	60dB		98MHz	500	200				kHz
Stereo separation (1KHz)	headphone		98MHz	28	22				dB
Stereo sensitivity	headphone			22	28				dB
Spurious rejection 103.35MHz	60dB		98MHz	60	50				dB
S/N Ratio	60dB	DIN Audio	98MHz	46	40				dB
Am. suppression	60dB		98MHz	36	30				dB
Mod 75kHz **Output Power 1kHz	Speaker 4	10% THD	98MHz	2.0	1.8				W
	Load 32			8+8	5+5				mW
Mod 22.5kHz **Output Power 1kHz	R_L:4	VOL MAX.	98MHz						mW
T.H.D. (75KHz dev.)	1mV		98MHz	1	2				%
Over load capacity		10% THD	98MHz		>106				dB
Calibration			90M		+-1000				KHz
			98M						
			106M						
*Lowest Batt. volt. LED OFF→ ON	60dB	R.O		4.0	4.2				V
Audio Fidelity –3dB (W/Pre-emphasis)	De-emphasis 50uSec		LOW	35	75				Hz
			HIGH	15k	12k				
Bass booster action 1KHz VOLUME AT CENTER POSITION	80Hz			+14	3				dB
	30Hz			-6	3				

Supply Voltage: DC 6V	R. O. :50 mW	Load: 4 Ohm	Modulation: Dev.22.5kHz @1kHz

emark:	Approved by	Released/Tested by
( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )		

MW ELECTRICAL PERFORMANCE

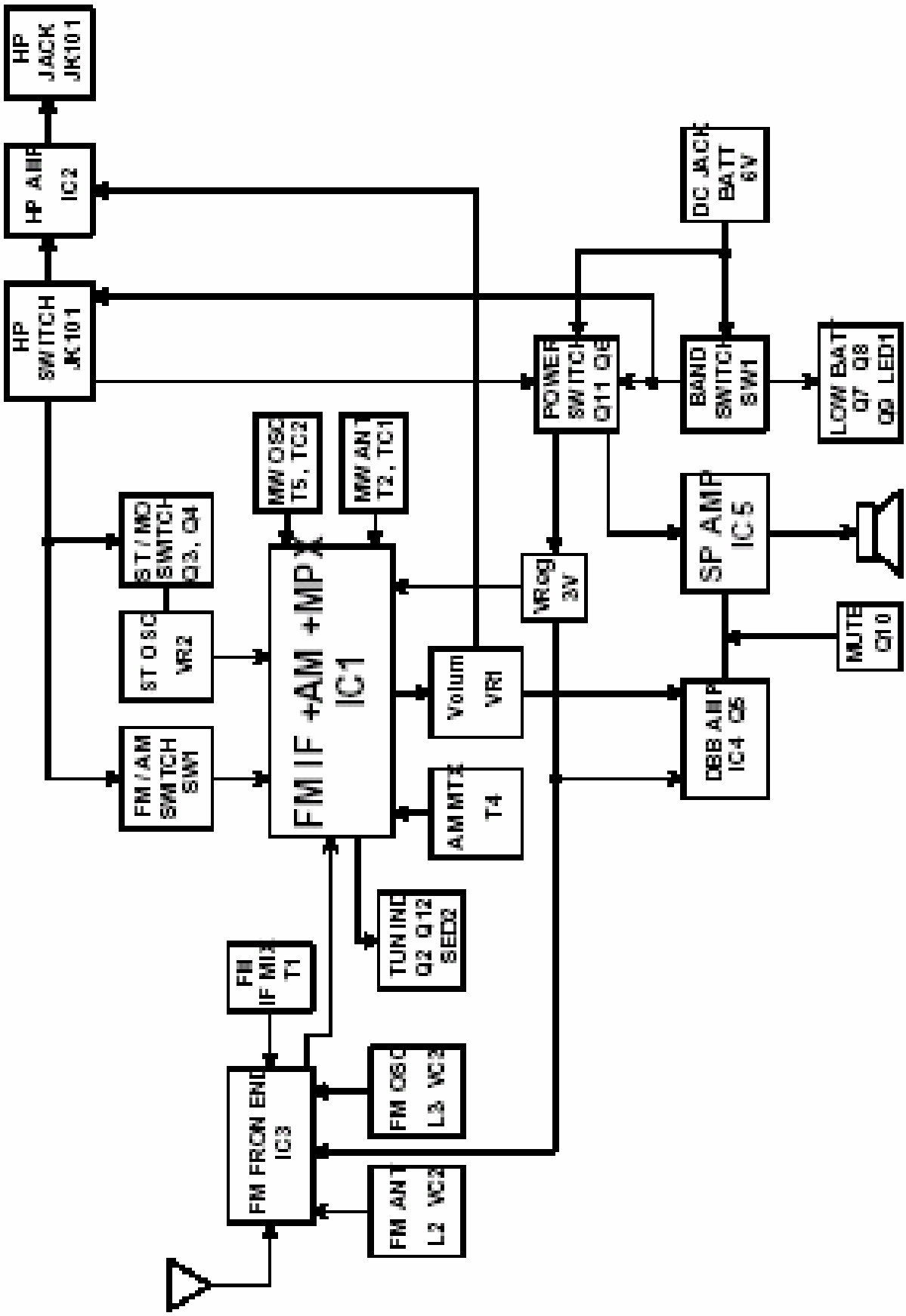
Model: U2(ATR-1)	Brand: COMMON	Temp: 25	R. H. : 75 %	Date: 2003/9/9

Test Item	Condition			Value		Test No.			Unit
	Input	Output	Freq.	Nom.	Lim.	1	2	3	
Tuning Range			Min.	515	+-7				kHz
			Max.	1730	+-20				
Intermediate freq.				455	+-3				kHz
Max. Sensitivity		S/N=6dB	600 kHz	48	52				dB
			1000 kHz	46	50				
			1400kHz	46	50				
Usable Sensitivity		S/N=20dB	600 kHz	52	58				dB
			1000 kHz	50	56				
			1400kHz	50	56				
Image Rejection		S/N=6dB	1000kHz	36	30				dB
I. F. Rejection (450KHz)		S/N=6dB		60	50				dB
Selectivity(10KHz)		S/N=6dB	1000kHz	32	26				dB
Bandwidth(-6dB)				7	+-3				KHz
T. H. D. (5mV)		R.O		2	4				%
*Lowest Batt. Volt. LED OFF→		R.O		4	4.2				V
Tuning Ind. Sens.					56				dB /m
S/N Ratio	(RF 5mV)				32				dB
Current Consumption	74dB /m	R.O		140	170				mA
Audio fidelity	74dB /m				<100				Hz
(-6dB)					>2.5				KHz
**Output power Mod 80%	74dB /m	10%THD		2	1.8				W
Over Load Capacity	80% Mod	10%THD		100	>90				dB /m
A. G. C. F. O. M.	100 dB /m				>50				dB
Calibration			600		+-50				KHz
			1000		+-80				
			1400		+-60				
Whistle Modulation(5mV/M)					<15				%

Supply Voltage: DC 6 V	R. O. : 50 mW	Load: 4 Ohm	Modulation: Dev.30% @1kHz

Remark:	Approved by	Released/Tested by
( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )		

BLOCK DIAGRAM



ALIGNMENT INSTRUCTIONS

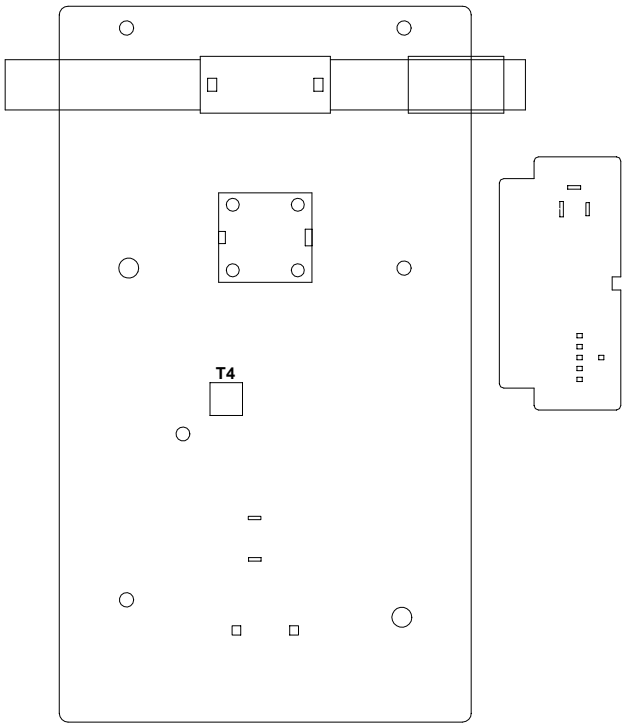
(1) ALIGNMENT FOR AM IF

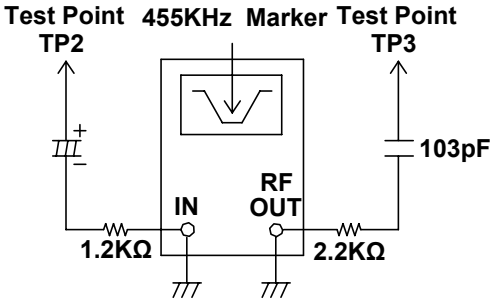
a. Required Instruments
AM IF Sweep Generator with Scope

b. Alignment Procedure

Mode	Adjustment	Procedure
AM	**T4**	(1) Turn on the radio. (2) Connect the input of the AM IF sweep generation in series with a resister of 1.2K Ohm to the test point TP2 and TP7. (3) Connect the RF output of the AM IF sweep generation in series with a resister of 2.2K ohm to another test point TP3. (4) Adjust T4 to have a max. output and best center marker frequency to 455kHz.

c. Instrument Connection





AM IF Sweep Generator

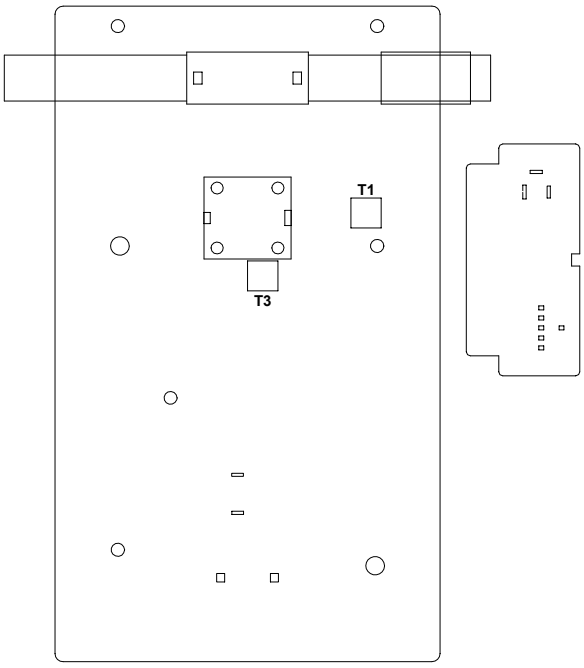
(2) ALIGNMENT FOR FM IF

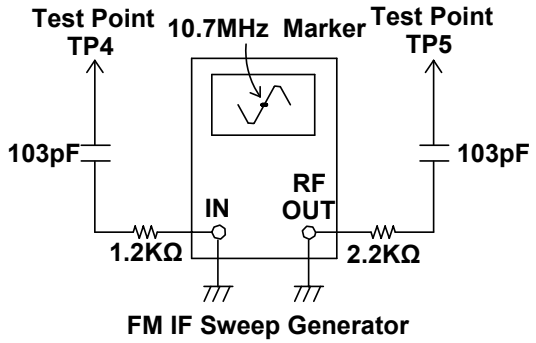
a. Required Instruments
FM IF Sweep Generator with Scope

b. Alignment Procedure

Mode	Adjustment	Procedure
FM	**T1** **T3**	(1) Turn on the radio. (2) Connect the input of the FM IF sweep generation in series with a resister of 1.2k Ohm to the test point TP4 and TP7. (3) Connect the RF output of the FM IF sweep generation in series with a resister of 2.2k ohm to another test point TP5. (4) Adjust T3 make curve with respect to the Center marker frequency of 10.7MHz. (5) Adjust T1 have a max.

c. Instrument Connection





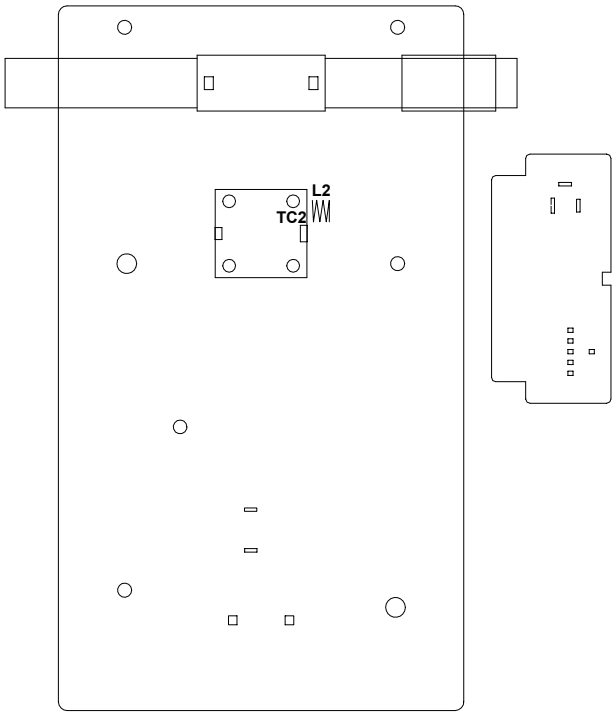
(3) ALIGNMENT FOR FM SENSITIVITY

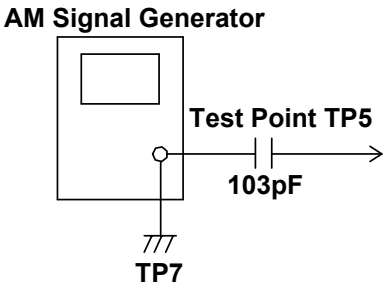
a. Required Instruments
FM Signal Generator
SSVM

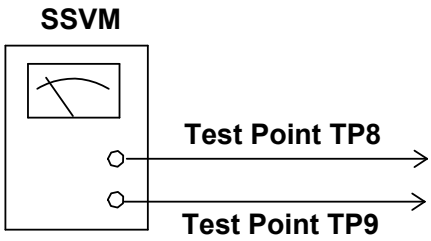
b. Alignment Procedure

Mode	Adjustment	Procedure
	L2 **TC2**	(1) Set the power switch to ON. (2) Connect a SSVM to the test point TP8 and TP9. (3) Connect the output of the FM signal generator to the test point TP5 and TP7. (4) Set FM 90 MHz. (5) Adjust L2 to have a max. Audio output. (6) Set FM 106 MHz. (7) Adjust TC2 to have a max. Audio output. (8) Repeat steps 4-7 until best sensitivity on these two frequencies is formed.

c. Instrument Connection







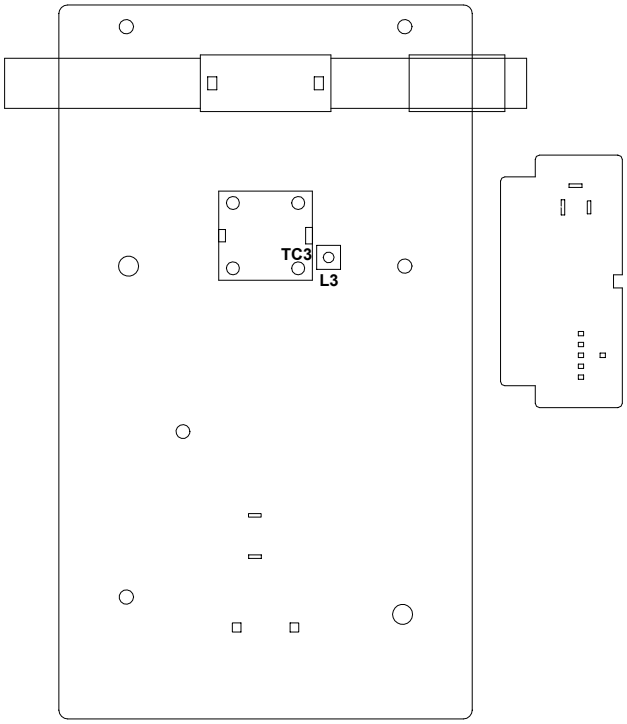
(4) ALIGNMENT FOR FM RANGE

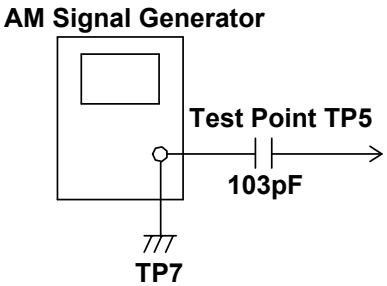
a. Required Instruments
FM Signal Generator
SSVM

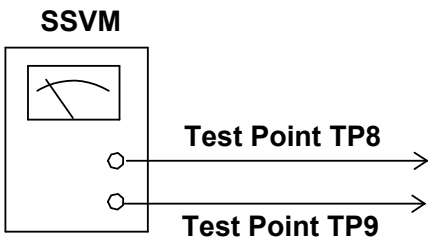
b. Alignment Procedure

Mode	Adjustment	Procedure
	L3 **TC3**	(1) Set the power switch to ON. (2) Connect a SSVM to the test point TP8 and TP9. (3) Connect the output of the FM signal generator to the test point TP5 and TP7. (4) Set FM 87 MHz. (5) Adjust L3 to have a max. Audio output. (6) Set FM 108.5 MHz. (7) Adjust TC3 to have a max. Audio output. (8) Repeat steps 4-7 until best sensitivity on these two frequencies is formed.

c. Instrument Connection







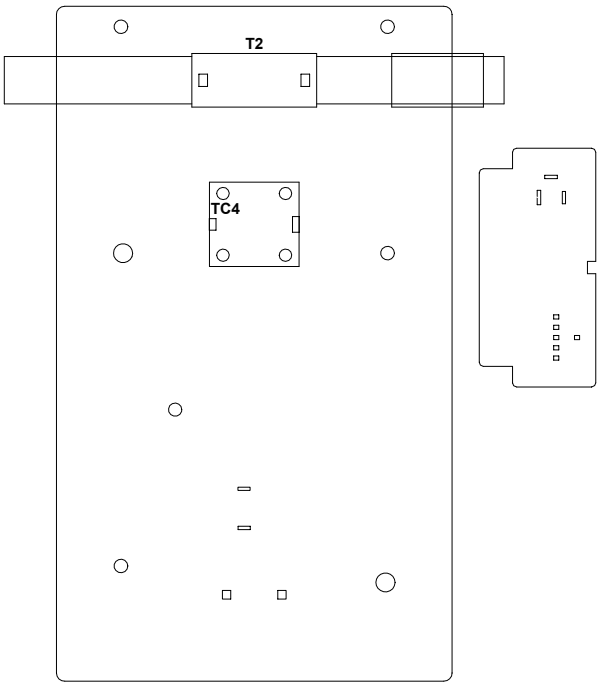
(5) ALIGNMENT FOR AM SENSITIVITY

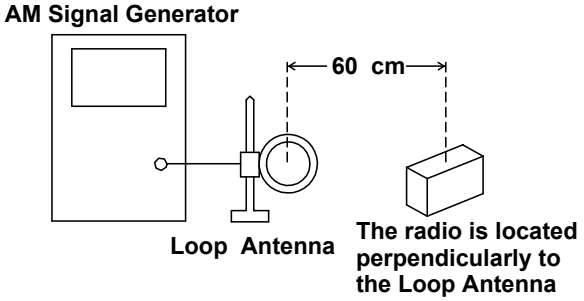
a. Required Instruments
AM Signal Generator
SSVM

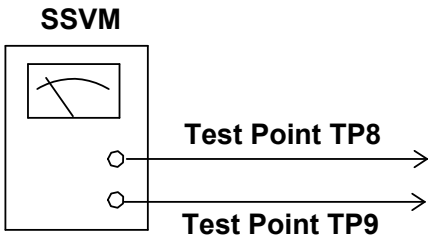
b. Alignment Procedure

Mode	Adjustment	Procedure
	T2 **TC4**	(1) Set the power switch to ON. (2) Connect a SSVM to the test point TP8 and TP9. (3) Connect the output of the FM signal generator to a standard loop antenna. (4) Set AM 600 kHz. (5) Adjust T2 to have a max. Audio output. (6) Set AM 1400 kHz. (7) Adjust TC4 to have a max. Audio output. (8) Repeat steps 4-7 until best sensitivity on these two frequencies is formed.

c. Instrument Connection







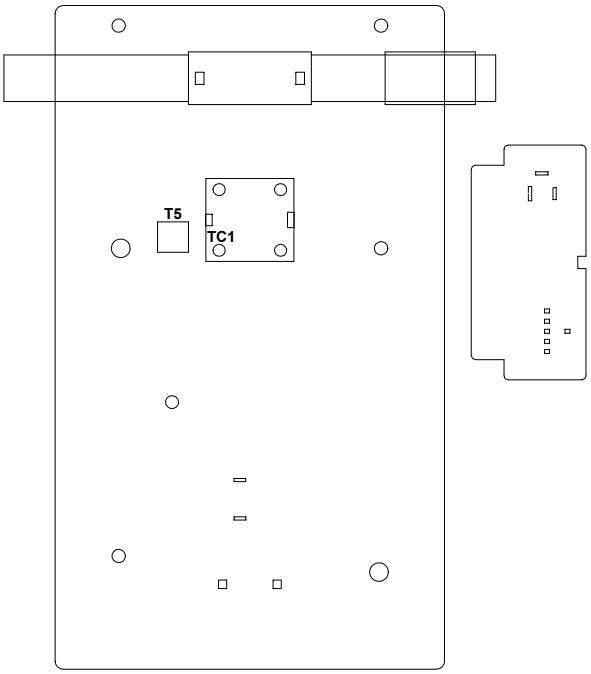
(6) ALIGNMENT FOR AM RANGE

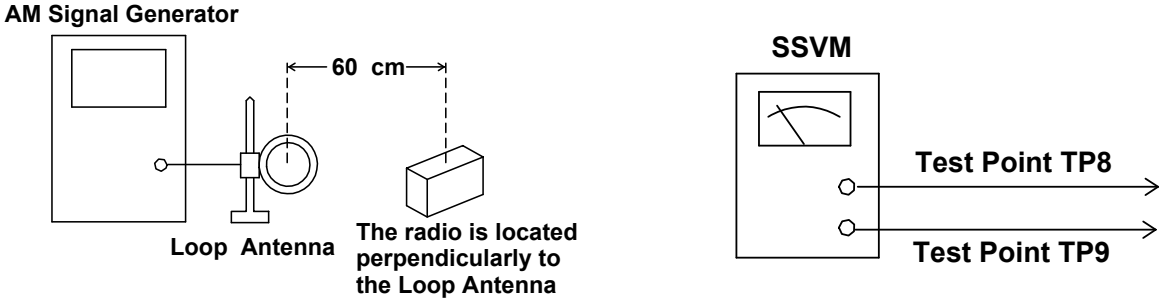
a. Required Instruments
AM Signal Generator
SSVM

b. Alignment Procedure

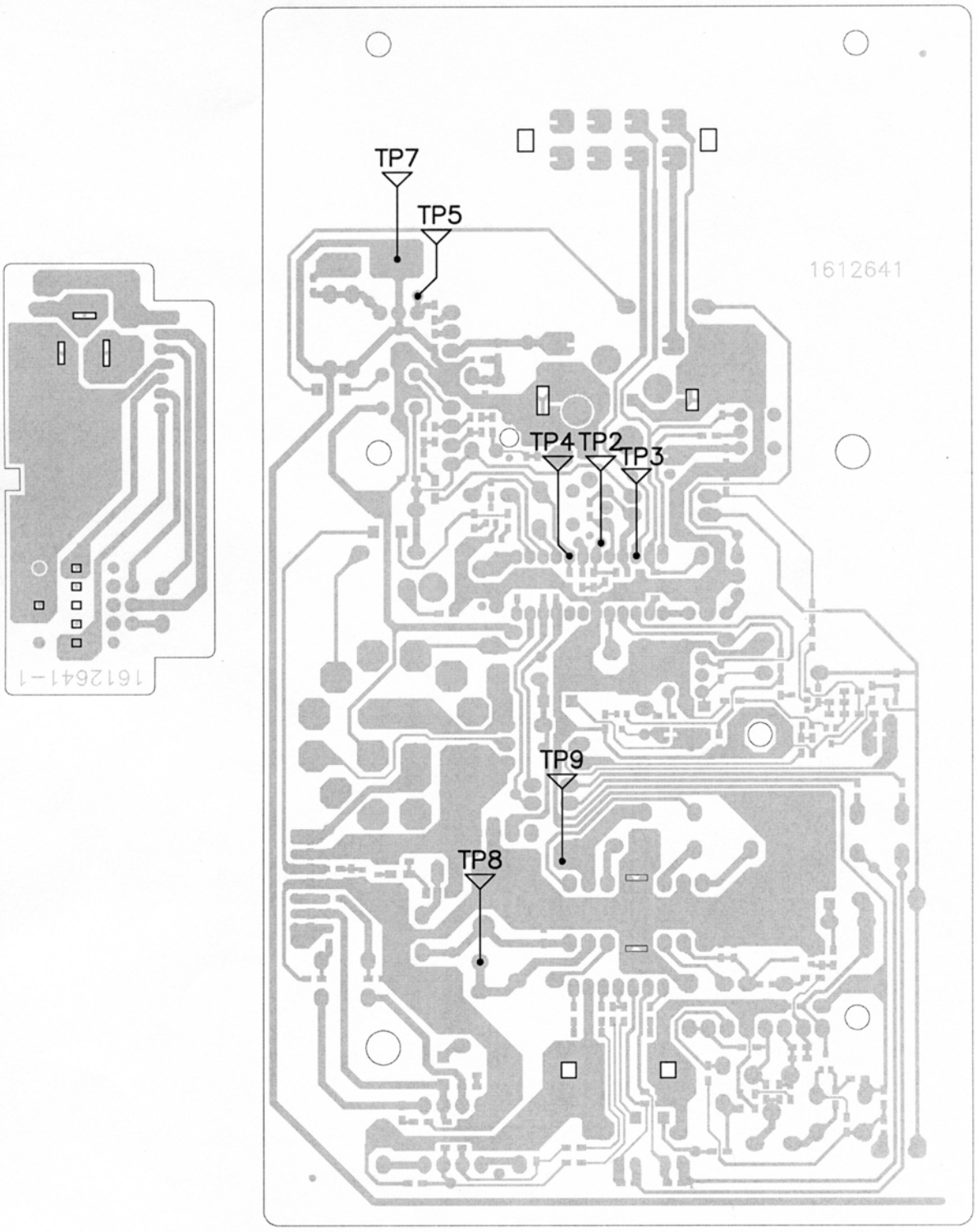
Mode	Adjustment	Procedure
	T5 **TC1**	(1) Set the power switch to ON. (2) Connect a SSVM to the test point TP8 and TP9. (3) Connect the output of the FM signal generator to a standard loop antenna. (4) Set AM 515 kHz. (5) Adjust T5 to have a max. Audio output. (6) Set AM 1750 kHz. (7) Adjust TC1 to have a max. Audio output. (8) Repeat steps 4-7 until best sensitivity on these two frequencies is formed.

c. Instrument Connection

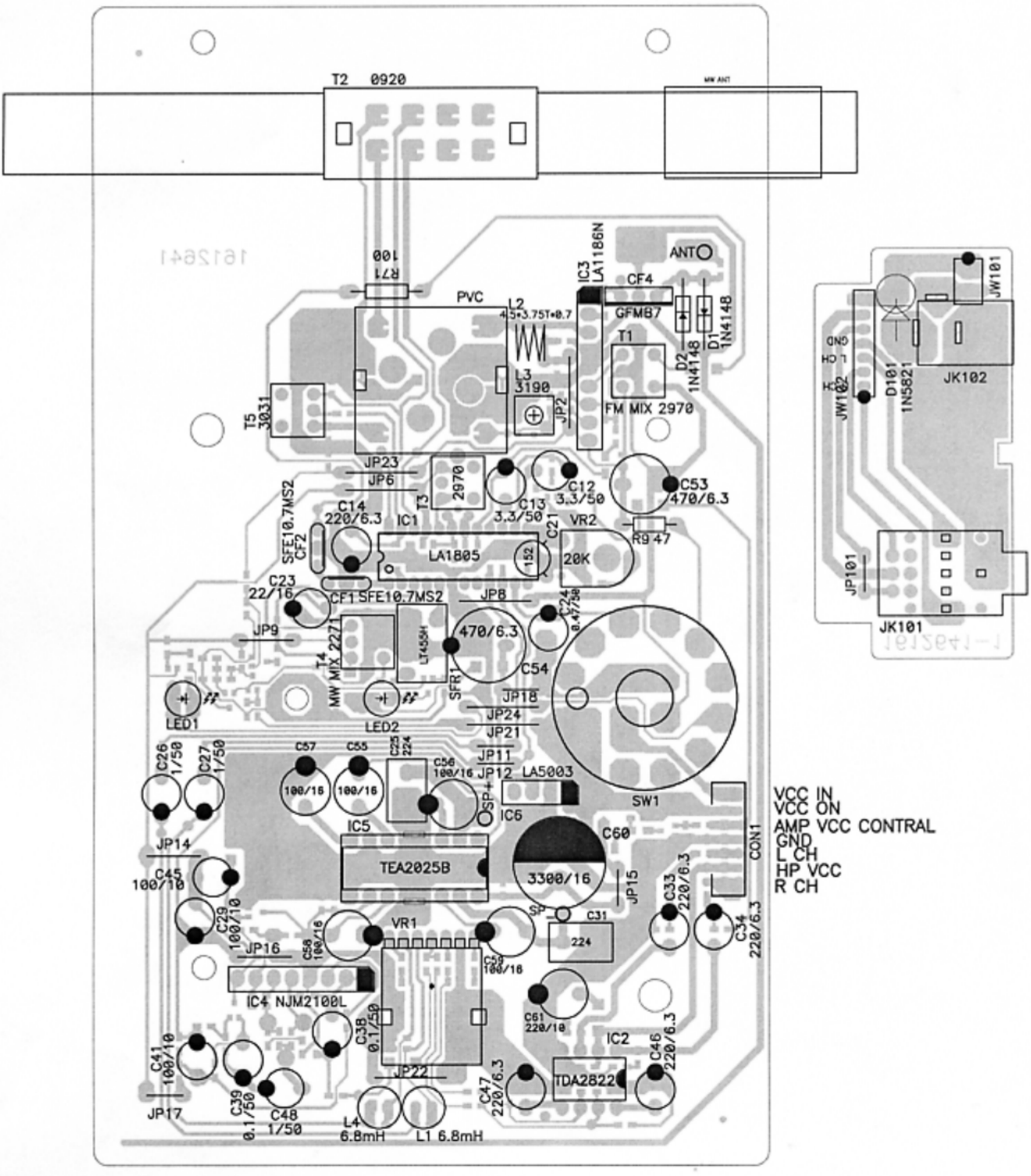




TEST POINTS DIAGRAM



MAIN PCB TOP VIEW



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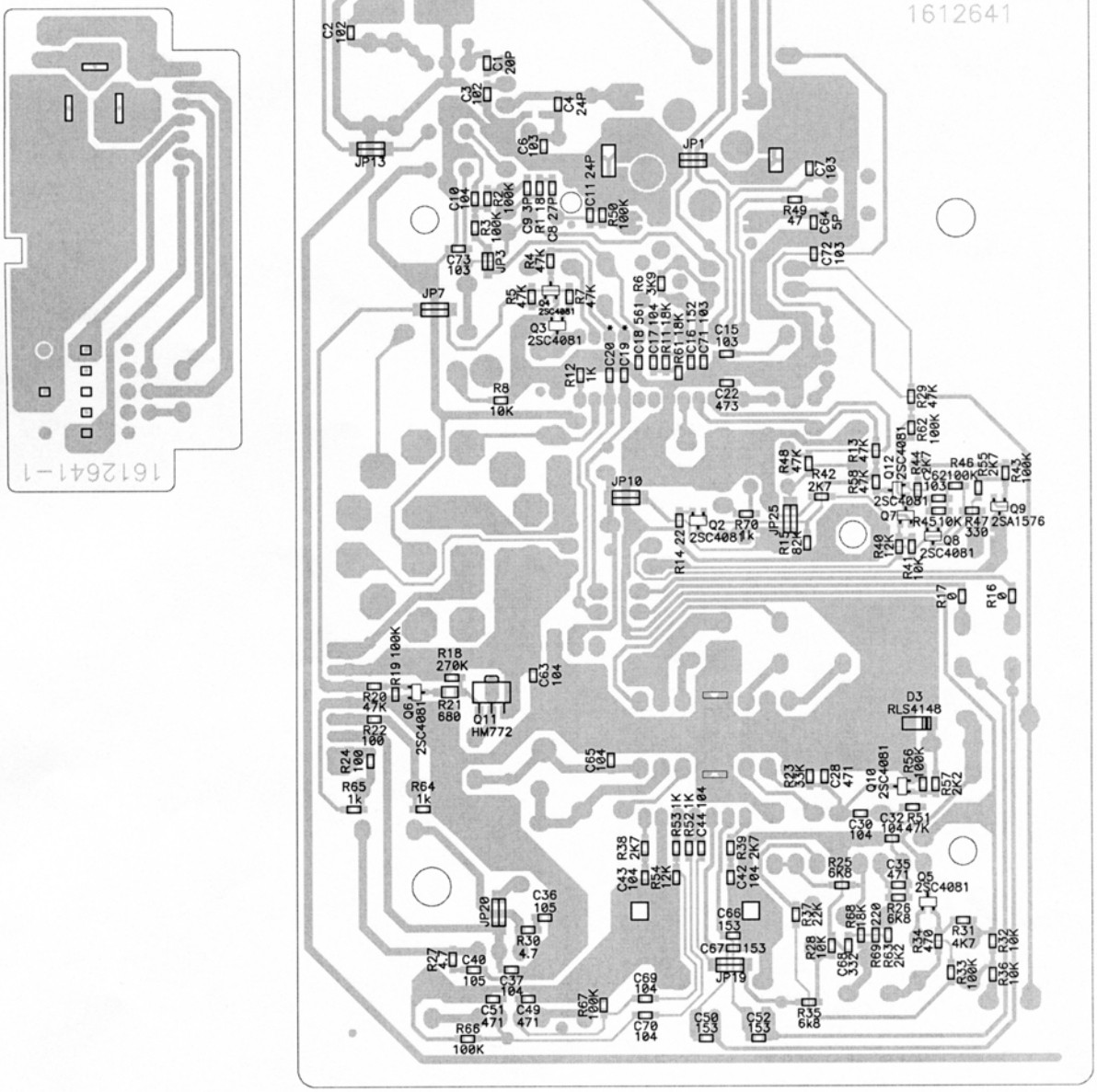
	Brookstone FCC	SANGEAN CE
VR1	50KA*2	50KB*2

MAIN PCB BOTTOM VIEW



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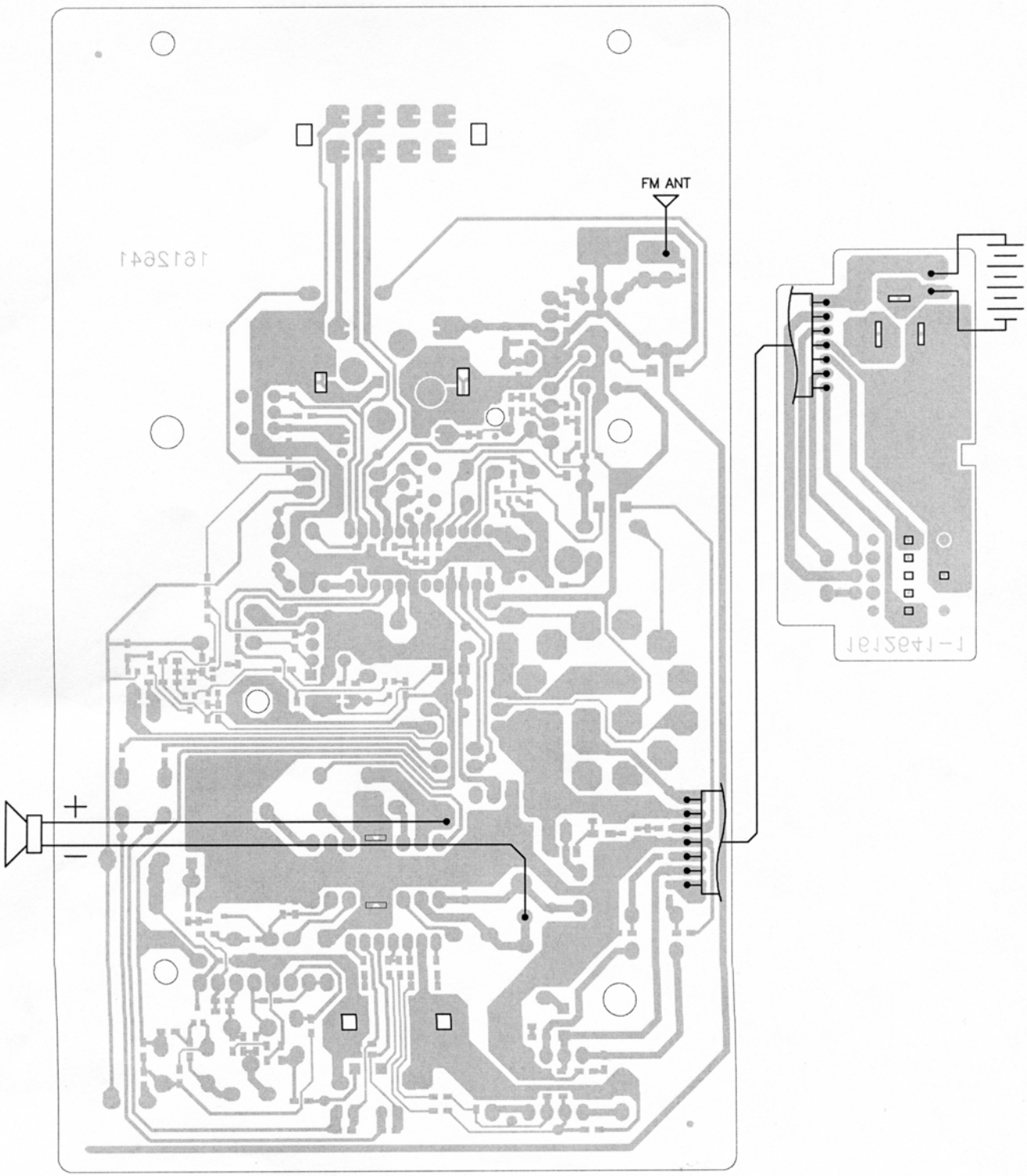
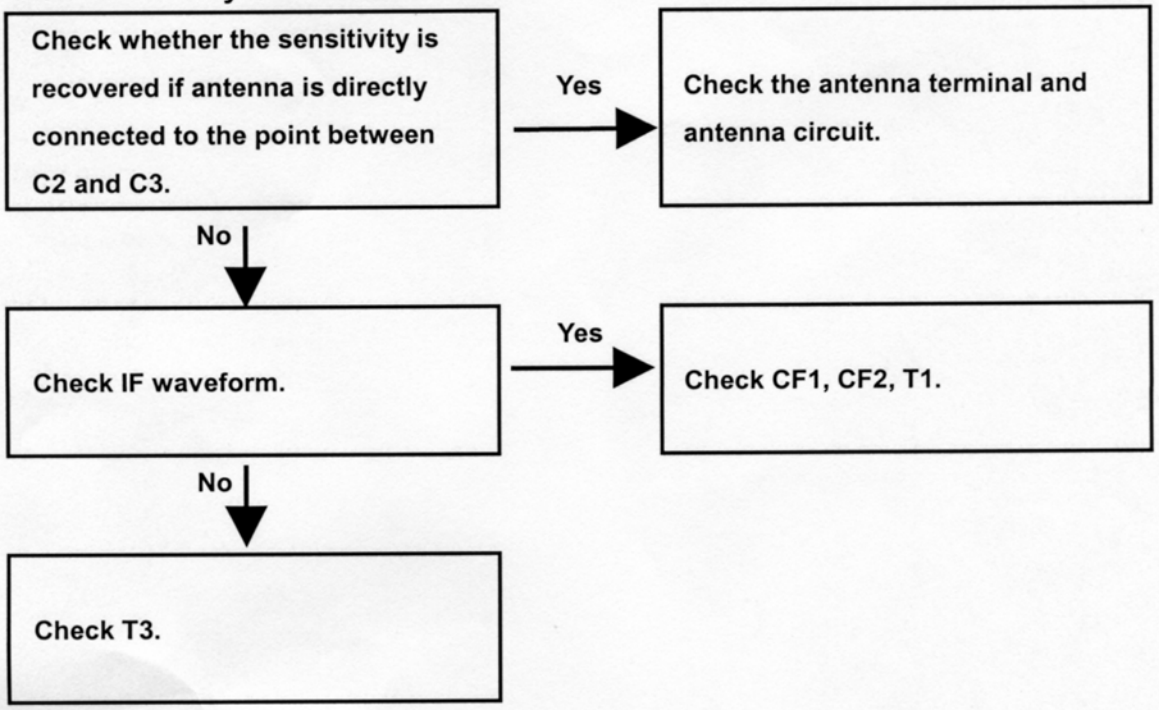
	Brookstone FCC	SANGEAN CE
C19,20	472	822

WIRING DIAGRAM

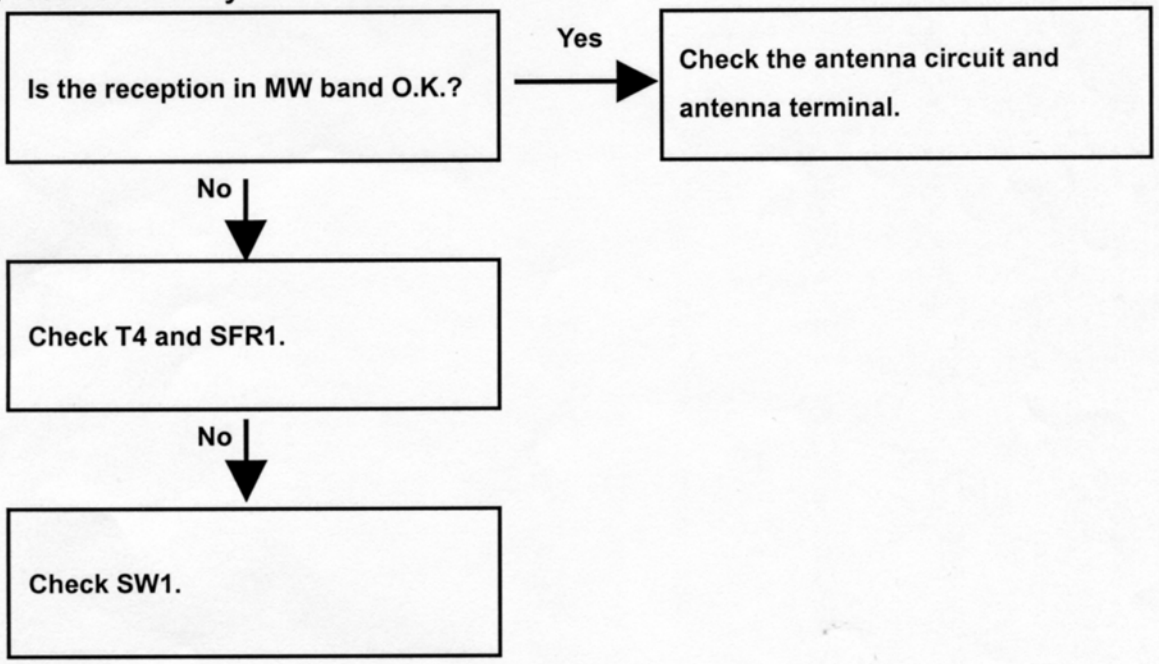


TROUBLESHOOTING FLOW CHART

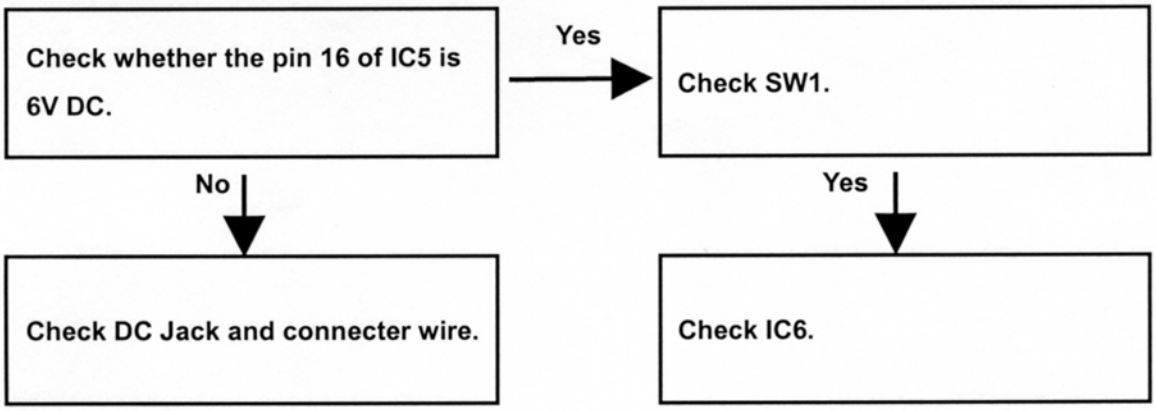
(1) Weak sensitivity on FM mode


Check whether the sensitivity is recovered if antenna is directly connected to the point between C2 and C3.
Yes
Check the antenna terminal and antenna circuit.
No
Check IF waveform.
Yes
Check CF1, CF2, T1.
No
Check T3.

(2) Weak sensitivity in AM band



(3) Power can not be turned on



ELECTRICAL PATS LIST

U2

Ref NO	Part No.	Description	Q'ty	Remark
1	1010140	IC LA5003	1	IC 6,
2	1012050	IC LA1186N	1	IC 3,
3	1012071	IC NJM2100L	1	IC 4,
4	1013360	IC UTC TDA2822-DIP8	1	IC 2,
5	1013600	IC LA1805 DIP24S	1	IC 1,
6	1013610	IC TEA2025B-PDIP	1	IC 5,
7	1020420	CH TR 2SA1576A/R	1	Q 9,
8	1021080	CH TR HM772 SOT-89	1	Q 11,
9	1022220	CH TR 2SC4081R	9	Q 2-8,10,12,
10	1040020T	DIODE 1N4148-T	2	D 1,2,
11	1041211	DIODE 1N5821	1	D 101,
12	1046011	CH DIODE MM4148	1	D 3,
13	1050310	LED RED 5 φ 137HR28DW	1	LED1,
14	1059040	LED ORN RT5-137YL28DW	1	LED2,
15	1110920	BAR ANT & COIL 0920	1	T 2,
16	1122271	ADJ.COIL 2271	1	T 4,
17	1122970	ADJ. COIL 2970	2	T 1,3,
18	1123031	ADJ. COIL 3031	1	T 5,
19	1123190	ADJ. COIL 3190	1	L 3,
20	1135902	FIXED COIL 6.8mHJ	2	L 1,4,
21	1144160	SP COIL 4.5x3.5Tx0.7	1	L 2,
22	1200560	PVC WF-420LT13-A24701S	1	
23	1313625	R-VR 50KB x2	1	VR 1,
24	1320120	S.F-VR 20KB(A)TD087P-O	1	VR 2,
25	1612641	PCB-A ATR-1	1	
26	1620771	SPK 3" 8Ω 7W	2	
27	1631501	SR2612-0403-15F5B-D8N144	1	SW 1,
28	1640060	JACK HP(F)	1	JK 101,
29	1647100	JACK DC-470AG PBT 2.0L	1	JK 102,
30	1664121	FILTER LT10.7MS2A10-A	2	CF 1,2,
31	1664170	FILTER LT455HW	1	SFR1,
32	1664222	FILTER GFMB7	1	CF 4,
33	1701207	CNT BASEx7P-H	1	CON1,
34	1704510	W/ASS'Y 200(2+7P)	1	CON101,
35	4410461T	EL 104M 50V 5x11	2	C 38,39,
36	4447461T	EL 474M 50V 5x11	1	C 24,
37	4410561T	EL 105M 50V 5x11	3	C 26,27,48,
38	4433561T	EL 335M 50V 5x11	2	C 12,13,
39	4422630T	EL 226M 16V 5x11	1	C 23,
40	4410721T	EL 107M 10V 5x11L	3	C 29,41,45,
41	4410730T	EL 107M 16V 6.3x11	5	C 55-59,
42	4422716T	EL 227M 6.3V 5X11L	5	C 14,33,34,46,47,
43	4422721T	EL 227M 10V 6.3X11.5-2.5	1	C 61,
44	4447710T	EL 477M 6.3V 10x12.5(5)	1	C 54,
45	4447711T	EL 477M 6.3V 8x11.5(3.5)	1	C 53,
46	4433890T	EL 338M 16V 13x25(5)	1	C 60,
47	4501520	PS 152J 50V	1	C 21,
48	4622460T	MY 224J 50V-T	2	C 25,31,
49	5003001	CH CC 030C 50V NPO-C	1	C 9,

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Ref NO	Part No.	Description	Q'ty	Remark
50	5005001	CH CC 050C 50V NPO-C	1	C 64,
51	5010261	CH CC 102K 50V X7R-C	2	C 2,3,
52	5010361	CH CC 103K 50V X7R-C	7	C 6,7,15,62,71-73,
53	5010471	CH CC 104Z 25V Y5V-C	12	C 10,17,30,32,37,42-44 ,63,65,69,70,
54	5010557	CH CC 105Z 10V F-C	2	C 36,40,
55	5015261	CH CC 152K 50V X7R-C	1	C 16,
56	5015361	CH CC 153K 50V X7R-C	4	C 50,52,66,67,
57	5020001	CH CC 200J 50V NPO-C	1	C 1,
58	5024001	CH CC 240J 50V NPO-C	2	C 4,11,
59	5027001	CH CC 270J 50V NPO-C	1	C 8,
60	5033261	CH CC 332K 50V X7R-C	1	C 68,
61	5047101	CH CC 471J 50V NPO-C	4	C 28,35,49,51,
62	5047365	CH CC 473Z 50V Y5V-C	1	C 22,
63	5056101	CH CC 561J 50V NPO-C	1	C 18,
64	5082261	CH CC 822K 50V X7R-C	2	C 19,20,
65	6010720T	RD 1/8W 47J-T	1	R 9,
66	6010724T	RD 1/8W 100J-T	1	R 71,
67	6100108	CH RD 1/16W 4.7J-C	2	R 27,30,
68	6100115	CH RD 1/16W 18J-C	1	R 1,
69	6100116	CH RD 1/16W 22J-C	1	R 14,
70	6100120	CH RD 1/16W 47J-C	1	R 49,
71	6100124	CH RD 1/16W 100J-C	2	R 22,24,
72	6100128	CH RD 1/16W 220J-C	1	R 69,
73	6100130	CH RD 1/16W 330J-C	1	R 47,
74	6100132	CH RD 1/16W 470J-C	1	R 34,
75	6100136	CH RD 1/16W 1KJ-C	6	R 12,52,53,64,65,70,
76	6100140	CH RD 1/16W 2.2KJ-C	2	R 57,63,
77	6100141	CH RD 1/16W 2.7KJ-C	6	R 35,38,39,42,44,55,
78	6100143	CH RD 1/16W 3.9KJ-C	1	R 6,
79	6100144	CH RD 1/16W 4.7KJ-C	1	R 31,
80	6100146	CH RD 1/16W 6.8KJ-C	2	R 25,26,
81	6100148	CH RD 1/16W 10KJ-C	6	R 8,28,32,36,41,45,
82	6100149	CH RD 1/16W 12KJ-C	2	R 40,54,
83	6100151	CH RD 1/16W 18KJ-C	3	R 11,61,68,
84	6100152	CH RD 1/16W 22KJ-C	1	R 37,
85	6100154	CH RD 1/16W 33KJ-C	1	R 23,
86	6100156	CH RD 1/16W 47KJ-C	9	R 4,5,7,13,20,29,48,51 ,58,
87	6100159	CH RD 1/16W 82KJ-C	1	R 15,
88	6100160	CH RD 1/16W 100KJ-C	11	R 2,3,19,33,43,46,50, 56,62,66,67,
89	6100165	CH RD 1/16W 270KJ-C	1	R 18,
90	6100194	CH RD 1/16W OJ-C	2	R 16,17,
91	6110194	CH JUMP OJ-B	7	JP 1,7,10,13,19,20,25,
92	6160134	CH RD 1/10W 680J-A	1	R 21,
93	6160194	CH RD 1/10W OJ-A	1	JP 3,
94	8000010	W/JUMP 5(10)0.6mm	6	JP 11,12,15,17,18,101,
95	8000030	W/JUMP 7.5(10)0.6mm	3	JP 9,14,16,
96	8000040	W/JUMP 10(10)0.6mm	7	JP 2,6,8,21-24,

U2

Ref NO	Part No.	Description	Q'ty	Remark
97	81569L0	W/PVC 36(0+0)BLK	1	
98	8173840	W/PVC 210(6+6)BLK	1	SP-
99	8173842	W/PVC 210(6+6)RED	1	SP+
100	8593240	W/2 180(6+6) R/W	1	JW 101,
101	8593270	W/2 110(6+9)R/B	1	SP1/2,
102	8601800	W/SHIELD/2 200(6+3)	1	ANT

MECHANICAL PARTS LIST

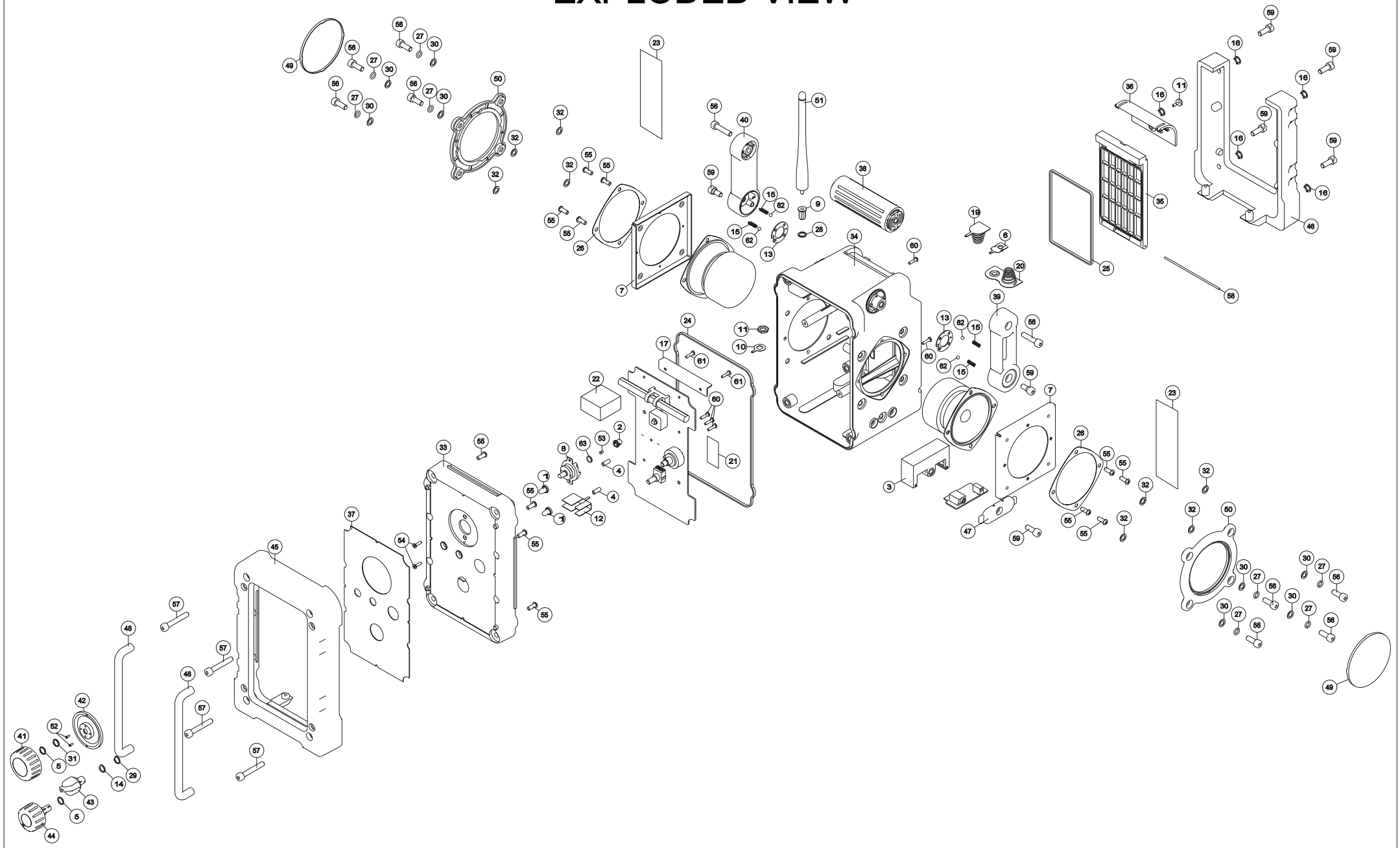
U2

Ref.NO	PART NO.	DESCRIPTION	Q'TY	DWG NO	REMARK
1	20J9010	LAMP GUIDE	2	A4-ATR-17	
2	20J9020	DRUM SHAFT	1	A4-ATR1-16	
3	20J9030	E/P & DC IN HOLDER	1	A2-ATR1-14	
4	20J9040	LED HOLDER	2	LED-16A	
5	21B1110	ROTARY KNOB RING	2	A4-330-38	
6	21D9020	BATTERY PLATE(+)	1		
7	21J9010	SPEAKER HOLDER	2	A4-ATR1-20	
8	21J9020	TUNING VR ASS'Y	1	A2-ATR1-27	
9	21J9030	ROD ANT HOLDER	1	A4-ATR1-29	
10	21J9040	ROD ANT TERMINAL	1	A4-ATR1-35	
11	21J9050	BATTERY SCREW HOLDER	1	A4-ATR1-31	
12	21J9060	HEAT SINK	1	A4-ATR1-39	
13	21J9070	HANDLE SUS-PLATE	2	A4-ATR1-40	
14	21J9080	ROTARY KNOB RING 8.7	1	A4-ATR1-44	
15	21J9090	CLICK SPRING	4	A4-ATR1-43	
16	21J9100	TPR FIX-WASHER	5	A4-ATR1-45	FOR BACK CAB.
17	21J9110	PCB BRACKET	1		
18	21J9120	INSERT M6 NUT	6		
19	21J9130	BATTERY SPRING(-)	1		
20	21J9140	BATTERY SPRING(+)(-)	1		
21	2262020	HEMELON SHEET	1		
22	2308006	EVA SPACER	1	A4-ATR1-41	
23	23J9000	16X105 3M468	2		
24	24J9010	CABINET PACKING	1	A3-ATR1-21	
25	24J9020	BATTERY COVER PACKING	1	A4-ATR1-22	
26	24J9030	SPEAKER PACKING	2	A4-ATR1-23	
27	24J9040	SPK COVER PACKING	8	A4-ATR1-25A	
28	24J9050	ROD ANT PACKING	1	A4-ATR1-25	
29	24J9060	BAND PACKING	1	A4-ATR1-25A	
30	24J9070	SPK SCREW PACKING	8	A4-ATR1-25	
31	24J9080	VOLUME PACKING	1	A4-ATR1-25A	
32	24J9090	SPK COVER & CAB. PACKING	8	A4-ATR1-25	
33	301J96A	FRONT CABINET	1	A1-ATR1-02	
34	303J96A	BACK COVER	1	A1-ATR1-04	
35	304J901	BATTERY COVER	1	A2-ATR1-06	
36	304J96A-1	COVER FIX PLATE	1	A3-ATR1-07	
37	306J901	FRONT PANEL PLATE	1	A3-ATR1-30	
38	309J96A	HANDLE BAR	1	A3-ATR1-12	
39	309J96A-1	HANDLE HOLDER(R)	1	A3-ATR1-13	
40	309J96A-2	HANDLE HOLDER(L)	1	A3-ATR1-13	
41	312J96A	TUNING KNOB	1	A4-ATR1-08	
42	312J96A-1	POINTER KNOB	1	A4-ATR1-10	
43	313J96A	BAND KNOB	1	A4-ATR1-11	
44	316J96A	VOLUME KNOB	1	A4-ATR1-09	
45	331J96A	FRONT CABINET CUSHION	1	A2-ATR1-03	
46	333J96A	BACK COVER CUSHION	1	A2-ATR1-05	
47	335J96A	E/P & DC IN CUSHION	1	A4-ATR1-19	
48	338J96A	FRAME METAL	2	A4-ATR1-28	
49	343J96A	SPEAKER GRILL	2	A4-ATR1-26	

U2

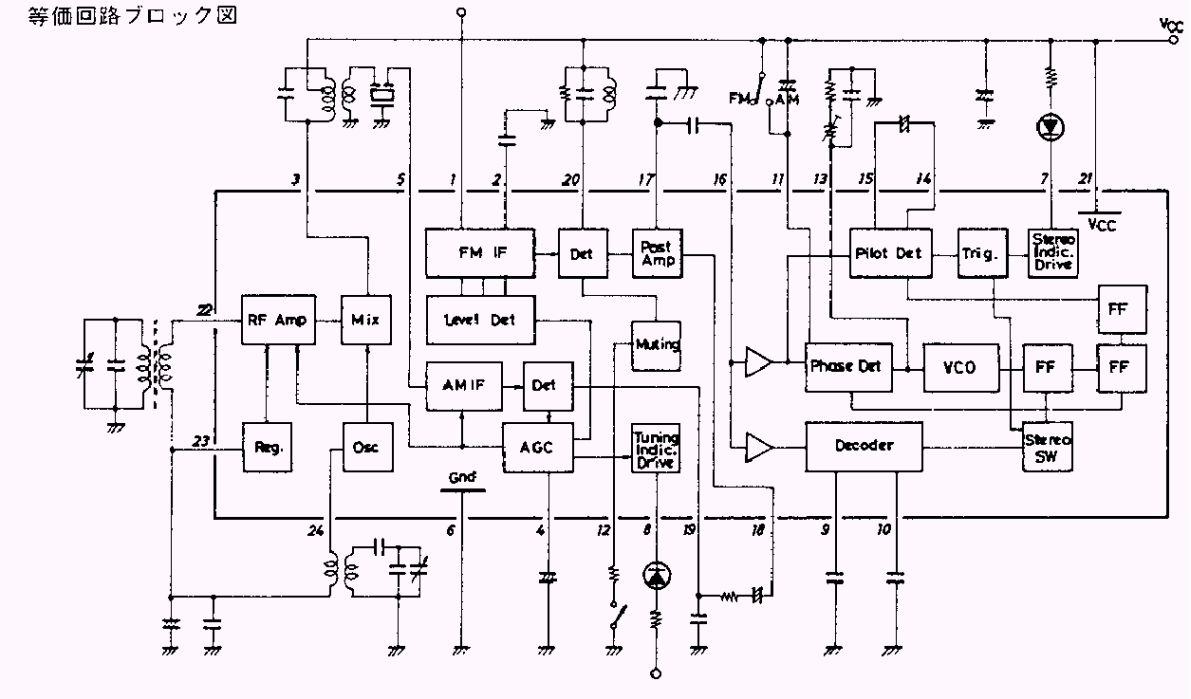
Ref.NO	PART NO.	DESCRIPTION	Q'TY	DWG NO	REMARK
50	343J96A-1	SPEAKER PANEL	2	A3-ATR1-18	
51	360J96A	ROD ANT	1		
52	9001052	SCREW JMP 2x5 NI	2		PI-KNOB
53	9002042	SCREW JMP 2.6x4 NI	1		PVC
54	9013101	SCREW JMF 3x10 ZK	2		TUNING
55	9054121	SCREW JMP 4x12 ZK	12		SPKx8/F.M.x4
56	9076146A	IN/HEXAGON SCREW M6x14	10		HANDLEx2/SPKx8
57	9076426	IN/HEXAGON SCREW M6x42	4		
58	9093096	BAT. COVER FIXBAR	1	A4-ATR1-33	
59	9096106A	IN/HEXAGON SCREW M6x10	7	A4-ATR1-36	HANDLEx2/BACKx4 /E/Px1
60	9103122	SCREW PTP 3x12(NI)	5		PCBx3/CABx2
61	9153102	SCREW PTPW 3x10(NI)	2		PCB
62	9994007	STEEL BALL 4	4		HANDLE
63	9998404	C RING d= 8.4	1		DRUM SHAFT

EXPLODED VIEW

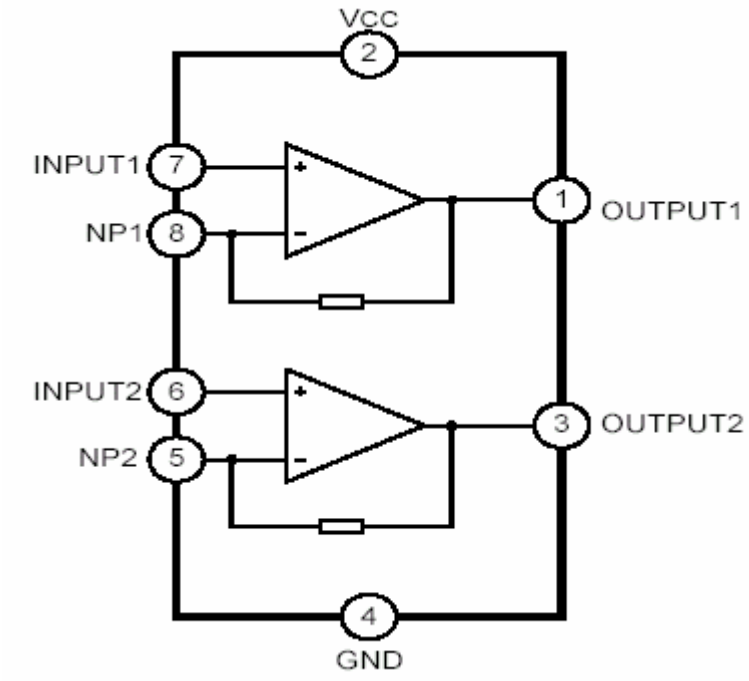


IC CIRCUIT BLOCK DIAGRAM

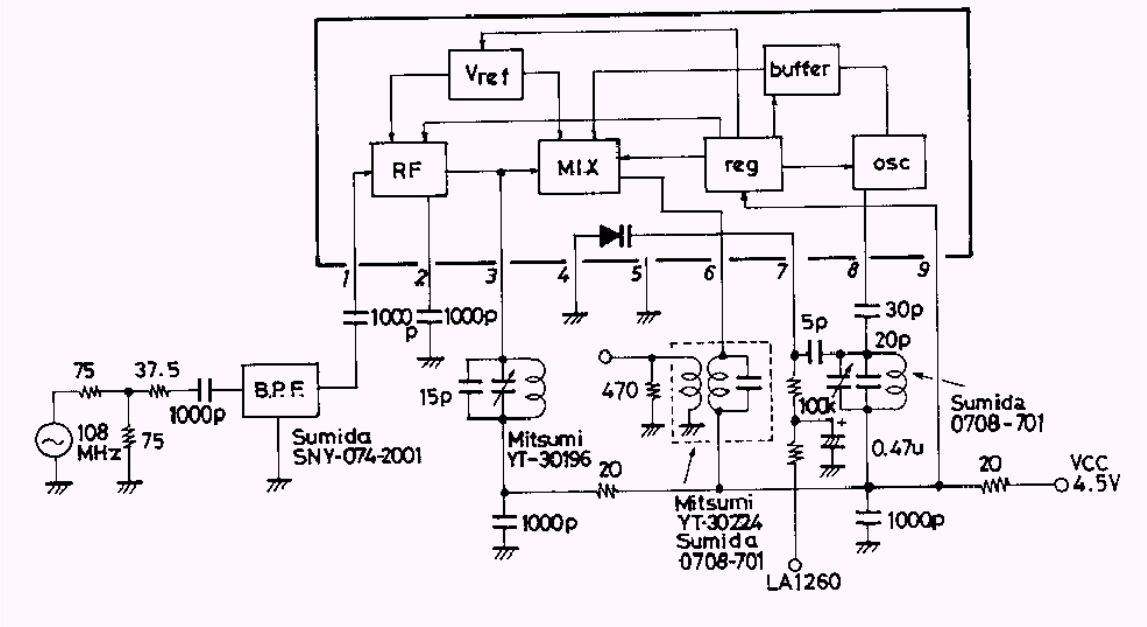
1. IC1 – LA1805



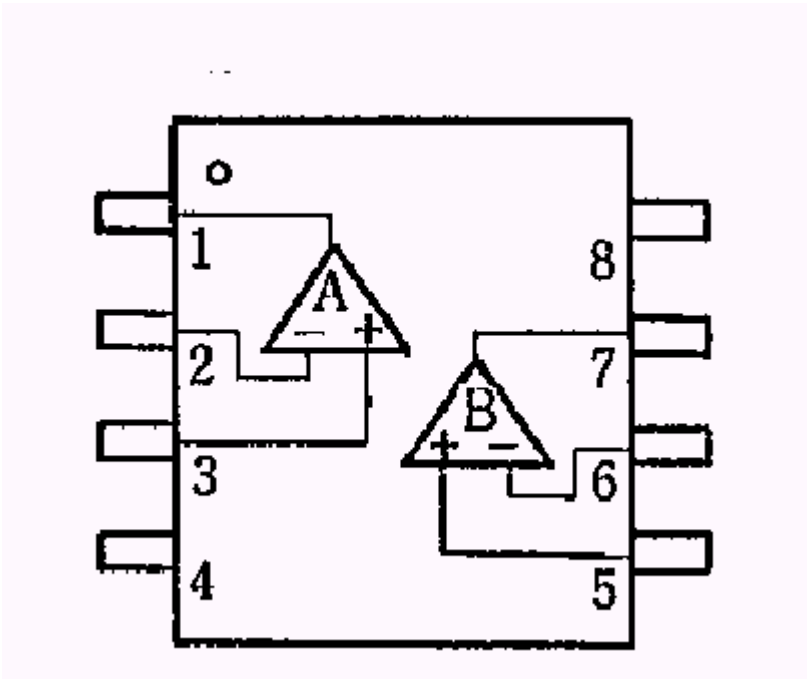
2. IC2 – TDA2822



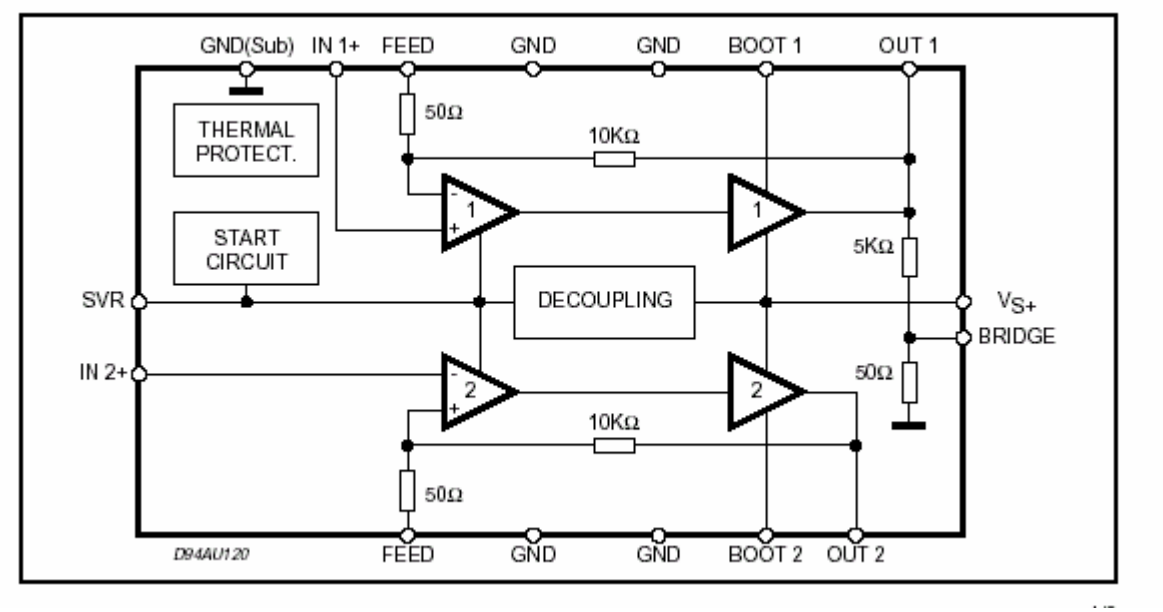
3. IC3 – LA1186N



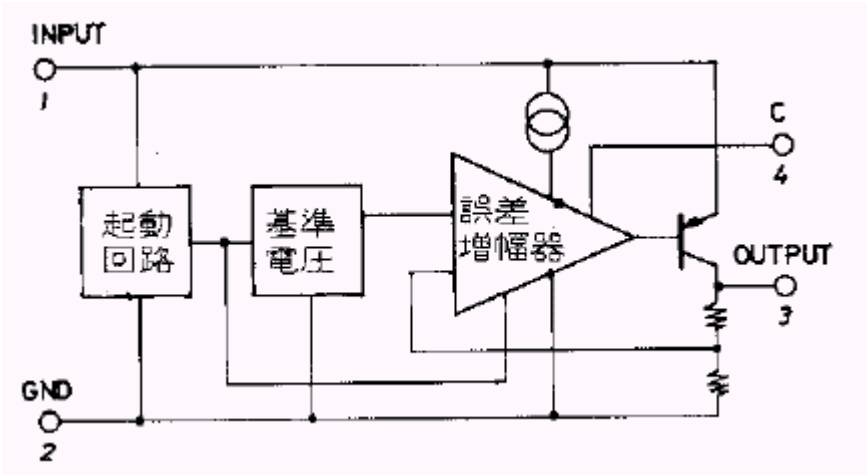
4. IC4 – NJM2100L



5. IC5 – TEA2025B



6. IC6 – LA5003



IC AND TRANSISTOR VOLTAGE CHART

IC1 – LA1805

PIN	FM	AM
1	1.5	1.5
2	1.5	1.5
3	3	3
4	0.3	0.6
5	1.5	1.5
6	0	0
7	0.5	0.3
8	1	0.3
9	1.5	1.5
10	1.5	1.5
11	2.4	3
12	0.5	0.5
13	0	0
14	1.4	1.4
15	0.5	0.9
16	1.5	1.4
17	1.5	1.5
18	1.5	1.5
19	0.3	0.3
20	3	3
21	3	3
22	1.5	1.5
23	1.5	1.5
24	1.5	1.5

IC2 – TDA2822

PIN	FM	AM
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0

IC3 – LA1186N

PIN	FM	AM
1	0.9	0
2	1.6	0
3	2.9	0
4	0	0
5	0	0
6	2.7	0
7	1.5	1.6
8	2.0	0
9	2.7	0

IC4 – NJM2100L

PIN	FM	AM
1	1.5	1.5
2	1.5	1.5
3	1.6	1.6
4	0	0
5	1.6	1.6
6	1.6	1.6
7	1.5	1.5
8	3	3

IC5 – TEA2025B

PIN	FM	AM
1	0	0
2	2.8	2.8
3	0	0
4	0	0
5	0	0
6	0.6	0.6
7	0	0
8	5.6	5.6
9	0	0
10	0	0
11	0.6	0.6
12	0	0
13	0	0
14	5.5	5.5
15	2.8	2.8
16	5.6	5.6

IC6 – LA5003

PIN	FM	AM
1	3	3
2	0	0
3	5	5

Transistor

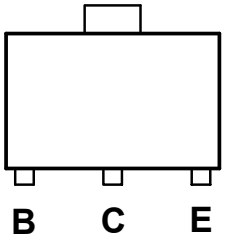
		FM	AM
Q2	C	3	3
	B	0.3	0.3
	E	0	0
Q3	G	0	0
	D	0	0
	S	0	0
Q4	C	0	0.9
	B	0.6	0
	E	0	0
Q5	C	3	3
	B	1.4	1.4
	E	0.8	0.8

		FM	AM
Q6	C	0	0
	B	0.6	0.6
	E	0	0
Q7	C	1.6	1.6
	B	2.2	2.2
	E	1.6	1.6
Q8	C	3	3
	B	1.5	1.5
	E	1.6	1.6
Q9	C	0	0
	B	3	3
	E	3	3

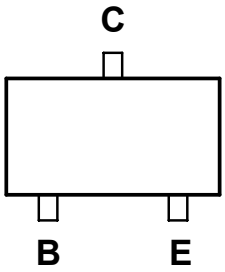
		FM	AM
Q10	C	0	0
	B	0	0
	E	0	0
Q11	C	5.7	5.7
	B	5	5
	E	5.7	5.7
Q12	C	0	0.3
	B	0.6	0
	E	0	0

Semiconductor Lead Identification

Transistors



HM772

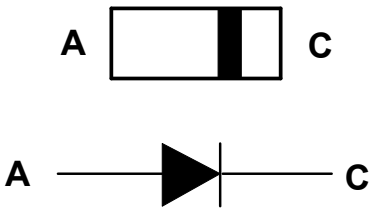


2SC4081
2SD1048
2SA1576

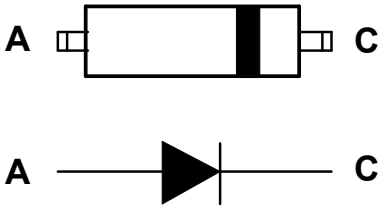
(E:Emitter C:Collector B:Base S:Source G:Gate D:Drain)

Diodes

Cathode Mark



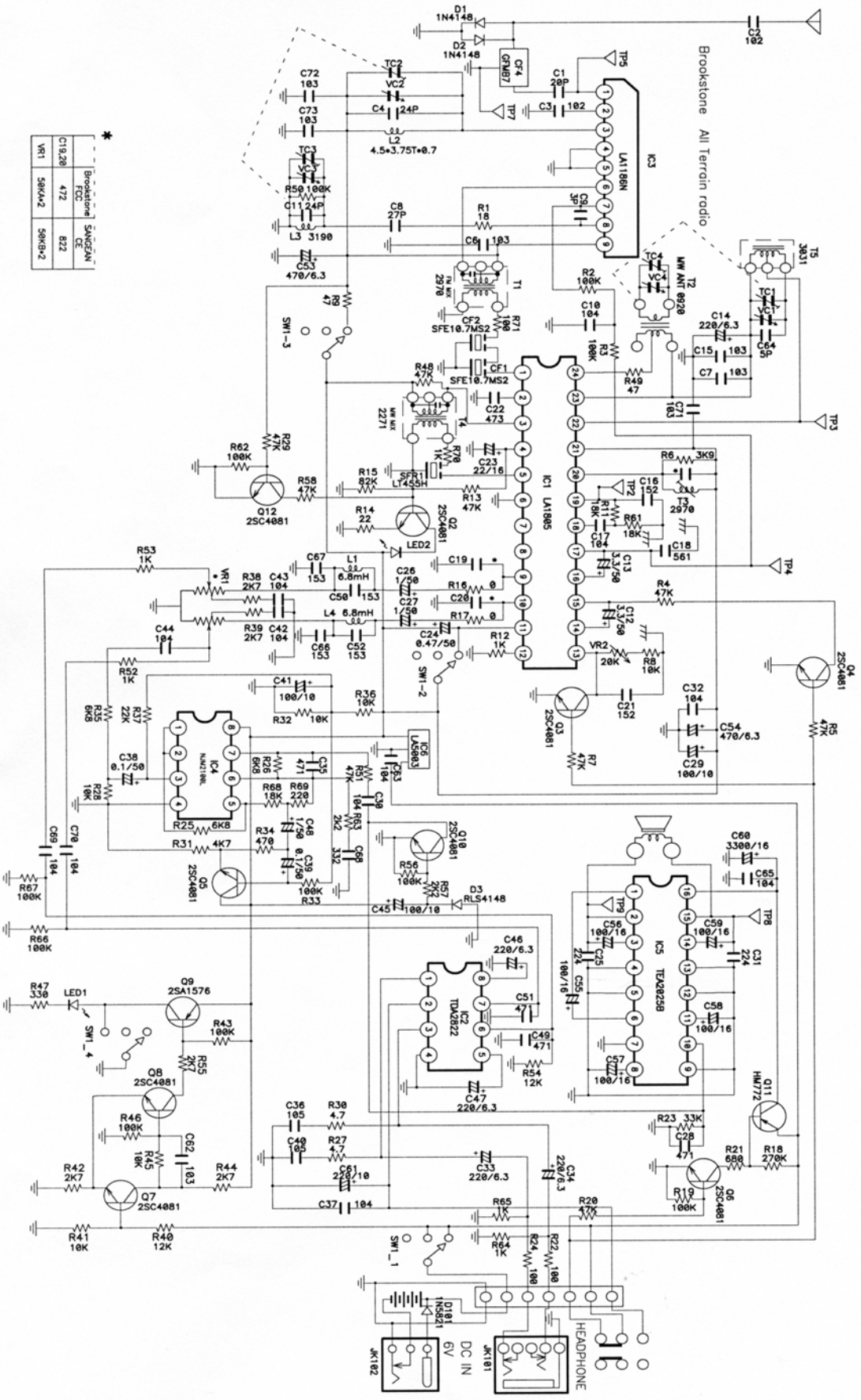
RLS4148



1N4148

(A:Anode C:Cathode)

SCHEMATIC DIAGRAM



	Brookstone FCC	SANGEAN CE
VR1	50KA+2	50KB+2
C19,20	472	822